

## Perfect Square Trinomials, Difference of Squares, and the Quadratic Formula

### Warm-Up:

Multiply the binomials and look for patterns

1.  $(x - 1)(x - 1)$

5.  $(x - 1)(x + 1)$

2.  $(x - 3)(x - 3)$

6.  $(x - 3)(x + 3)$

3.  $(2x - y)(2x - y)$

7.  $(x - 1)(x - 6)$

4.  $(2ax - b)(2ax - b)$

8.  $(2x - 3y)(2x - 3y)$

### Ex. 1

Multiply these expressions. Describe any patterns you observe.

1.  $(x - 1)(x - 1)$

3.  $(2x + y)(2x + y)$

2.  $(x + 3)(x + 3)$

4.  $(2ax + b)(2ax + b)$

**Perfect Square Trinomial**

$$(a + b)(a + b) = (a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)(a - b) = (a - b)^2 = a^2 - 2ab + b^2$$

**Both expressions have three terms: the square of a, twice a times b, and the square of b.**

**Ex. 3**

**Multiply these expressions and describe any patterns you observe**

**1.  $(x - 1)(x - 1)$**

**3.  $(x + 6)(x + 6)$**

**2.  $(x - 3)(x - 3)$**

**4.  $(2x + y)(2x + y)$**

**Difference of Squares**

$$(a + b)(a - b) = a^2 - b^2$$

**The expression  $a^2 - b^2$  has two terms: the square of a and the square of b.**

**Ex. 5**

**Identify each expression as a perfect square trinomial, difference of squares, or neither. Factor (unless its neither).**

**1.  $x^2 + 2x + 1$**

**5.  $x^2 + 4x + 1$**

**2.  $y^2 + 4y + 4$**

**6.  $9x^2 + 25$**

**3.  $x^2 - 5x + 25$**

**7.  $y^2 + 2yz + z^2$**

**4.  $4x^2 - 25$**

**Quadratic Formula use the form of the equation:  $ax^2 + bx + c = 0$**

$$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

**Group Project**

Use the quadratic formula on these equations to check that you are using it correctly.

1.  $x^2 - 4x - 12 = 0$

Answers:  $x = -2$  and  $x = 6$

2.  $2x^2 - x - 3 = 0$

Answers  $x = 1.5$  and  $x = -1$

3.  $4x^2 - 25 = 0$

Answers  $x = 2.5$  and  $x = -2.5$

**Solve these equations**

1.  $2x^2 + 5x - 3 = 0$

2.  $3x^2 - 2x - 4 = 0$

**Ex. 6**

Use the quadratic formula to solve these equations

1.  $2x^2 + 7x + 3 = 0$

3.  $2x^2 + 2x = -1$

2.  $4x^2 = 5x + 2$

## Answer Key

### Warm Up (page 1)

1.  $x^2 - 2x + 1$

2.  $x^2 - 6x + 9$

3.  $4x^2 - 4xy + y^2$

4.  $4a^2x^2 - 4abx + b^2$

5.  $x^2 - 1$

6.  $x^2 - 9$

7.  $x^2 - 7x + 6$

8.  $4x^2 - 12xy + 9y^2$

### Ex. 1 (page 1)

1.  $x^2 - 2x + 1$

2.  $x^2 + 6x + 9$

3.  $4x^2 + 4xy + y^2$

4.  $4a^2x^2 + 4abx + b^2$

### Ex. 3 (page 2)

1.  $x^2 - 2x + 1$

2.  $x^2 - 6x + 9$

3.  $x^2 + 12x + 36$

4.  $4x^2 + 4xy + y^2$

### Ex. 5 (page 2)

1. pst  $(x + 1)(x + 1)$

2. pst  $(y + 2)(y + 2)$

3. neither

4. dos  $(2x + 5)(2x - 5)$

5. neither

6. neither

7. pst  $(y + z)(y + z)$

### Group Project (page 3)

see answers

### Solve these equations (page 3)

1.  $x = -3$  and  $0.5$

2.  $x = -0.869$  and  $1.535$   
(rounded to the nearest thousandth)

### Ex. 6 (page 3)

1.  $x = -0.5$  and  $-3$

3. no solution

4.  $x = 1.569$  and  $-0.318$   
(rounded to the nearest thousandth)